

Shoulder disorders in general practice: prognostic indicators of outcome

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SUMMARY

Background. Shoulder pain is common in primary health care. Nevertheless, information on the outcome of shoulder disorders is scarce, especially for patients encountered in general practice.

Aim. To study the course of shoulder disorders in general practice and to determine prognostic indicators of outcome.

Method. For this prospective follow-up study, 11 Dutch general practitioners recruited 349 patients with new episodes of shoulder pain. The participants filled out a questionnaire at presentation and further ones after 1, 3, 6 and 12 months; these contained questions on the nature, severity and course of the shoulder complaints. The association between potential prognostic indicators and the status of shoulder complaints (absence or presence of symptoms) was evaluated after one and 12 months of follow-up.

Results. After one month, 23% of all patients showed complete recovery; this figure increased to 59% after one year. A speedy recovery seemed to be related to preceding overuse or slight trauma and early presentation. A high risk of persistent or recurrent complaints was found for patients with concomitant neck pain and severe pain during the day at presentation.

Conclusion. A considerable number of patients (41%) showed persistent symptoms after 12 months. It may be possible to distinguish patients who will show a speedy recovery from those with a high risk of long-standing complaints by determining whether there is a history of slight trauma or overuse, an early presentation or an absence of concomitant neck pain.

Keywords: musculoskeletal disorders; epidemiology.

Introduction

SHOULDER complaints are common; population-based studies have reported point prevalences ranging from 70 to 260 per 1000.¹⁻⁴ Even though a considerable number of episodes may remain unreported, the general practitioner is frequently consulted regarding shoulder complaints. The annual consulting incidence in Dutch general practice has been estimated at 12 to 25 per 1000.⁵⁻⁷ A lower incidence of 6.6 per 1000 has been reported by National Morbidity Surveys in England and Wales.⁸

A painful or stiff shoulder is mostly caused by articular or periarticular rheumatic conditions within the shoulder joint (intrinsic causes). Shoulder pain can also be caused by referred pain from internal organs, neurological or vascular disorders, neoplasms, and disorders of the cervical spine (extrinsic causes). Intrinsic shoulder disorders are often considered to be self-limiting, and of relatively short duration. However, in many cases the prognosis is not so favourable. Persisting pain, or a limited range of motion, have been reported after several years of follow-up.⁹⁻¹² In a community survey of shoulder disorders in the elderly, 108 patients were examined three years after the initial diagnosis. The findings indicated that no less than 74% showed persisting signs of their condition.¹³

The medical literature on shoulder disorders is predominantly based on hospital surveys, although annually only a small proportion of shoulder patients in general practice ($\pm 8\%$) are referred for a specialist opinion.⁵ The differential diagnosis of shoulder pain is difficult owing to the complex anatomical and functional structure of the shoulder joint. This has resulted in substantial confusion and lack of consensus regarding diagnostic criteria and the classification of shoulder disorders. Consequently, information on the outcome of the various conditions of the shoulder joint is scarce, especially for patients encountered in general practice.

This paper presents the results of a prospective follow-up study of shoulder complaints in Dutch general practice. The objective of this study was to investigate the course of shoulder disorders after the initial presentation to the general practitioner. Prognostic indicators of either a speedy recovery or persistent and recurrent shoulder complaints were evaluated.

Method

Eighteen general practitioners from 11 practices, representing a population of 35 150 patients, participated in the study. Over one year, from April 1993 to April 1994, the general practitioners registered all consultations regarding shoulder complaints. Patients with a new episode (that is, patients who had not consulted their physician for the afflicted shoulder in the preceding year) were eligible for participation. Selection criteria were: informed consent; age 18 years or older; ability to complete questionnaires (no dementia, sufficient knowledge of the Dutch language); shoulder complaints originating from within the shoulder joint (no known neurological or vascular disorders, neoplasms, referred pain from internal organs or systemic rheumatic conditions); and no fractures or luxations of the shoulder joint.

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Outcome measures

At inclusion, the participants received a baseline questionnaire containing questions on demographic variables, previous complaints, precipitating events, duration of symptoms at presentation, functional disability, and the severity of their shoulder pain at night and during the day (11-point ordinal scale, ranging from 0 'no pain' to 10 'very severe pain'). Follow-up questionnaires were sent after one, three, six and 12 months, with additional questions on the recovery and recurrences of shoulder complaints. Participants recorded the status of symptoms (absence or presence of shoulder pain). Participants whose complaints had ceased were asked to estimate the date of their recovery.

Prognostic indicators

The following potential prognostic indicators were considered: diagnosis at presentation; treatment initiated at presentation (medication, injections, referral for physiotherapy); and patient characteristics at presentation (data from the baseline questionnaire).

Shoulder complaints were classified according to clinical guidelines issued by the Dutch College of General Practitioners.¹⁴ These guidelines, which are largely based on the concepts of Cyriax,¹⁵ contain a classification of shoulder complaints into four intrinsic shoulder syndromes (Table 1). Most of the participating practitioners were familiar with the Cyriax method of systematic examination of the cervical spine and shoulder joint, and an additional two-hour training session was given preceding the study. During the 12 months of follow-up, the general practitioners recorded data on diagnosis and treatment at each consultation.

Statistics

We used multivariate logistic regression to determine which variables predict a speedy recovery (no complaints at one month), and which variables are related to a high risk of persistent or recurrent complaints after 12 months. The models were fitted by stepwise forward selection of individual variables ($P_{in} < 0.05$, $P_{out} > 0.10$). The number of potential prognostic indicators were restricted in the analysis of smaller subsets of patients, to make sure that the models contained at least 10 cases per variable. Selection criteria for including a variable were based on the results of bivariate analysis: for odds ratios < 1 , the upper boundary of the 95% confidence interval could not exceed 1.5; for odds ratios > 1 , the lower boundary had to be larger than 0.67. The 'indicator method', as described by Miettinen,¹⁶ was used for

variables with more than 10 missing values. This method prevents exclusion from the analysis, due to missing information, of a disproportionately large number of cases. Adjusted odds ratios are presented in Tables 4 and 5, with the corresponding 95% confidence limits. The overall rate of correct classification is presented as an indication of the goodness-of-fit of the logistic model. Although this proportion may not be as adequate as other goodness-of-fit statistics (such as the deviance residual or the Hosmer-Lemeshow Test¹⁷), it gives an indication of the goodness-of-fit of the final logistic model.

Results

During the recruitment period of one year, the general practitioners recorded 392 cases of shoulder pain. Approximately 85% of all presenting new episodes were actually recorded (according to estimates by the practitioners themselves); 349 patients met the selection criteria and were enrolled in the prospective follow-up study. The baseline questionnaire was returned by 335 participants (96%). Table 2 lists age, sex, initial diagnosis and treatment, and some other patient characteristics. The subacromial syndrome, particularly rotator cuff tendinitis (30% of all cases), was the most frequently recorded diagnosis at presentation, followed by capsular syndrome (22% of all cases). Later, during follow-up, the initial diagnosis was changed for 60 out of 141 patients who were examined at least twice.

Management of shoulder complaints

Initial treatment at presentation is shown in Table 2. During the follow-up year, approximately 40% of all study patients consulted their general practitioner at least one more time because of shoulder complaints. A total of four or more consultations were recorded for 27 patients (8%). Management during the follow-up year consisted of a 'wait-and-see policy' or medication (mainly NSAIDs) for 80 patients (24%). Nearly one-third of the study population, 107 patients, were referred for physiotherapy and 79 patients (24%) were treated with local injections of a steroid or anaesthetic. A combination of both injections and physiotherapy was offered to 19% (65 patients). Surgery of the shoulder joint was performed in four cases.

Additional diagnostic procedures — including 38 radiographs, 18 laboratory tests (blood samples) and 12 magnetic resonance imaging (MRI) or computed tomography (CT) scans — were requested for 49 patients (15%). Thirty-three patients (10%) were referred for a specialist opinion, resulting in nine consulta-

Table 1. Summary of clinical guidelines for the classification of shoulder complaints.*

Syndrome	Diagnostic criteria
Capsular syndrome (capsulitis, arthrosis, 'frozen shoulder', etc.)	Restriction of lateral rotation, abduction and medial rotation. Pain in C5 dermatome.
Acute bursitis	Restriction of abduction. Severe pain in C5 dermatome. Acute onset, no evident preceding trauma.
Acromioclavicular syndrome	Restriction of horizontal adduction. Pain in the area of the acromioclavicular joint and/or C4 dermatome. Painful arc during abduction.
Subacromial syndrome: rotator cuff tendinitis chronic bursitis rotator cuff tears	Pain in the C5 dermatome. No restriction of passive range of motion. At least one positive resistance test: bursitis - variable/little pain, normal power tendinitis - pain, normal power cuff tears - little pain, loss of power
Rest group (unclear clinical pictures, fractures, luxations, myalgia, etc.)	

* Guidelines issued by the Dutch College of General Practitioners.¹⁴

Table 2. Patient characteristics of participants in the follow-up study ($n = 335$).

	Number of patients	%
Sex:		
Male	146	44
Female	189	56
History of shoulder complaints:		
No	179	54
Yes	154	46
Precipitating cause:		
Unknown	165	49
Injury	39	12
Strain, overuse: unusual activities	42	13
Strain, overuse: usual activities	60	18
Duration of current episode at presentation:		
<1 week	48	14
1 week–1 month	122	37
1 month–6 months	115	34
>6 months	50	15
Diagnosis at presentation:		
Capsular syndrome	75	22
Acute bursitis	56	17
Acromioclavicular syndrome	14	4
Subacromial syndrome*	159	48
Unclear	31	9
Concomitant neck pain	141	43
Initial treatment at presentation:		
Wait-and-see or medication only	161	48
Referral for physiotherapy	96	29
Local injection of anaesthetic or steroid	75	23
	Mean	SD
Age (years)	49.6	14.4
Severity of pain at night at presentation†	6.3	3.2
Severity of pain during the day at presentation†	7.2	2.4

* Subacromial syndrome: 102 cases of rotator cuff tendinitis (30% of all patients), 42 cases of chronic bursitis (13% of all patients), 15 cases of mixed clinical picture or rotator cuff tears. † 11-point ordinal scale (0 = no pain, 10 = very severe pain).

tions with a rehabilitation specialist (BAJ) who works in close cooperation with the participating general practices. In most other referrals, a rheumatologist or orthopaedist was consulted.

Course of shoulder complaints

Response rates to the follow-up questionnaires were 92% ($n = 321$) at one month, 91% ($n = 316$) at three months, 89% ($n = 312$) at six months, and 87% ($n = 302$) at 12 months. Table 3 presents the proportion of patients reporting absence of symptoms for the total study population and for the separate diagnostic categories.

After one month, 23% of all patients reported an absence of shoulder complaints. This proportion slowly increased to 59% after one year. Minor differences can be seen between the diagnostic categories, particularly after one and three months. The outcome appeared to be somewhat better in cases of acute bursitis, whereas the prognosis for chronic bursitis was relatively poor.

Many patients (41%) reported persistent symptoms one year after presentation to the general practitioner. This proportion

included 58 cases with recurrent complaints, following initial recovery. The median duration of the initial presenting episode was 21 weeks from presentation. Many patients did not seek additional treatment for long-standing discomfort: 62% of patients reporting persistent complaints had not consulted a physician or physiotherapist during the final six months of follow-up.

Prognostic indicators of outcome

Table 4 presents the variables which were significantly related to the absence of symptoms at one month. Separate models were fitted for the total study population and for the two most frequently recorded diagnoses at presentation: tendinitis and capsular syndrome. A precipitating cause of strain or overuse due to unusual activities, and initial injection therapy seemed to be related to a favourable outcome (odds ratio 2.6 and 1.8, respectively). Variables predicting a poor prognosis at one month were a diagnosis of chronic bursitis at presentation (odds ratio 0.2), a long duration of symptoms at presentation (odds ratio 0.5), and initial referral for physiotherapy (odds ratio 0.4, compared with no treatment or medication only).

Strain or overuse and a relatively short duration of symptoms seemed to be related to a favourable outcome, particularly in cases of rotator cuff tendinitis. In patients with capsular syndrome, concomitant neck pain at presentation and initial treatment were associated with outcome.

Potential prognostic indicators of persistent or recurrent complaints at 12 months are listed in Table 5. Concomitant neck pain at presentation (odds ratio 2.8) and a high baseline score for pain during the day (odds ratio 2.0) were related to a high risk of persistent or recurrent symptoms. Variables which seemed to indicate a good prognosis were a diagnosis of acute bursitis and slight trauma preceding the shoulder pain (odds ratios 0.4).

Other potential prognostic indicators, such as age, sex, a positive history of shoulder complaints, involvement of the dominant side, acute onset, concomitant diabetes mellitus or overuse due to normal activities (such as manual labour of household activities), were not related to outcome (data not presented).

Discussion

This prospective follow-up study evaluated the course of shoulder disorders in general practice. The study included 349 cases consulting the general practitioner because of a new episode of shoulder pain. Additional information on the incidence, management and patient characteristics of specific diagnostic categories is given elsewhere.¹⁸

The response to the postal questionnaires was relatively high (between 87% and 96%). Consequently, a worst-case analysis resulted in only slightly lower recovery rates. We therefore assume that the presented data give a fairly accurate estimate of the rate of recovery from shoulder disorders in our study population. The proportion of patients reporting an absence of symptoms was 23% after one month and 59% after 12 months.

Our observation of the frequent persistence of symptoms after 12 months adds to the reports of poor long-term outcome in hospital-based studies^{9-12,19} and a population-based survey in the elderly.¹³ A considerable number (41%) of the participants in our study reported persistent or recurrent shoulder pain 12 months after the initial presentation of their complaints to the general practitioner. Despite this high prevalence of persistent symptoms, relatively few follow-up consultations were recorded by the general practitioners. Although this may, to some extent, reflect incomplete recording by the practitioners, many patients with long-standing complaints reported not having sought addi-

Table 3. Recovery by initial diagnosis: number of patients (actual rates) reporting absence of complaints at each stage of follow-up.

	1 month		3 months		6 months		12 months	
	n	%	n	%	n	%	n	%
All patients	72	23	138	44	155	51	175	59
Capsular syndrome	21	30	34	49	39	57	41	63
Acute bursitis	20	38	34	67	30	59	36	71
Rotator cuff tendinitis	19	20	35	38	47	51	46	54
Chronic bursitis	3	8	13	32	17	44	21	55
Other*	9	16	22	39	22	40	31	55

* Acromioclavicular syndrome, mixed clinical pictures, rotator cuff tears.

Table 4. Predictors of recovery. Adjusted odds ratios for patient characteristics and treatment strategies predicting absence of shoulder complaints after 1 month. Separate models are presented for the total study population and for the two most frequently recorded diagnoses at presentation*.

	Odds ratio	95% confidence limits	Correctly classified†
<i>All patients (n=311)</i>			
Diagnosis at presentation: chronic bursitis	0.2	0.1, 0.7	77%
Strain/overuse due to unusual, strenuous activities	2.6	1.2, 5.6	
Duration of symptoms (longer than 1 month)	0.5	0.3, 0.8	
Treatment:			
physiotherapy	0.4	0.2, 0.9	
injections	1.8	1.0, 3.6	
<i>Rotator cuff tendinitis (n=95)</i>			
Strain/overuse due to unusual, strenuous activities	7.4	2.0, 27.6	86%
Duration of symptoms (longer than 1 month)	0.1	0.0, 0.5	
<i>Capsular syndrome (n=70)</i>			
Concomitant neck pain at presentation	0.1	0.0, 0.5	79%
Treatment:			
physiotherapy	0.2	0.0, 1.8	
injections	4.4	1.1, 17.0	

* Multivariate logistic regression (forward stepwise selection of variables; $P_{in} < 0.05$, $P_{out} > 0.10$). † Odds ratios reflect chance of recovery within 1 month with indicated treatment strategy compared with medication or 'wait-and-see' policy only (initial treatment at presentation).

Table 5. Predictors of persistent symptoms. Adjusted odds ratios for patient characteristics predicting persistent or recurrent shoulder complaints after 12 months.*

	Odds ratio	95% confidence limits	Correctly classified
<i>All patients (n = 294)</i>			
Concomitant neck pain at presentation	2.8	1.7, 4.6	67%
Severity of pain during the day	2.0	1.2, 3.3	
Precipitating trauma	0.4	0.2, 0.9	
Diagnosis at presentation: acute bursitis	0.4	0.2, 0.8	

* Multivariate logistic regression (forward stepwise selection of variables; $P_{in} < 0.05$, $P_{out} > 0.10$). † > 7 points on an 11-point ordinal scale (0 = no pain, 10 = very severe pain).

tional treatment.

One of our objectives was to identify sub-groups of patients for whom either a speedy recovery or long-standing and/or recurrent complaints could be predicted. A variety of patient characteristics have been assumed to modify recovery from shoulder disorders. Diabetes mellitus,^{20,21} cervical spondylosis and radicular symptoms,²⁰ increasing age,^{19,22} and involvement of the dominant side^{9,12} are possibly related to a poor prognosis. Trauma preceding the symptoms,¹⁹ early presentation,^{12,23,24} overuse due to sport or hobbies,¹² acute onset²⁴ and a high erythrocyte sedimentation rate²⁵ might predict a favourable outcome. Although the value of many prognostic indicators could not be confirmed by other studies, we included the majority of these patient characteristics in our analysis.

Our findings indicate that a history of strain or overuse and a short duration of symptoms before presentation (<1 month) may indeed predict a speedy recovery. The association was even stronger in cases of rotator cuff tendinitis, which is in accordance with the observations of Chard *et al.*¹² These authors found that, in 137 cases of rotator cuff tendinitis, the above two characteristics distinguished the patients who had recovered from those with active tendinitis. In our study, concomitant neck pain at presentation appeared to be related to persistent symptoms, particularly in cases of capsular syndrome. A similar association has been suggested by Loew²⁰ for 'frozen shoulders'. Our analysis of the outcome after one year confirmed the prognostic value of a history of trauma described by Yamanaka and Matsumoto.¹⁹ The association between severe symptoms during the day, at presen-

tation, and long-standing, persistent symptoms is not an unexpected finding, but it has not been reported by earlier studies.

The diagnosis at presentation, in particular that of acute or chronic bursitis, was significantly related to the outcome after one and 12 months of follow-up. However, these results may cause some confusion, as there is no international consensus on the classification of shoulder complaints. It is often difficult to identify the source of the lesion, and signs and symptoms may vary with repeated examinations. The participating practitioners changed their initial diagnosis of a considerable number of patients who were examined at least twice. Although these included patients with complaints of uncertain origin, which were later given a more specific diagnosis, we prefer not to attach too much weight to the potential prognostic value of the diagnosis at presentation.

In the Netherlands, physiotherapy is part of primary care and general practitioners may directly refer patients for physiotherapy. This explains the high referral rate in our study (nearly 50% during 12 months of follow-up). Initial treatment at presentation was only related to outcome after one month: injection therapy seemed to be rather favourable, compared with referral to physiotherapy. However, it should be noted that differences in outcome are not only related to the applied intervention, but also to differences in severity of the condition.²⁶ The more severe the problem, the worse the prognosis; and, perhaps, the more severe the problem, the more likely the patient is to be referred for physiotherapy.

The effectiveness of interventions for shoulder disorders should, of course, be studied in trials using concealed, random allocation of cases to the interventions under study. As yet, systematic reviews of randomized trials show that there is insufficient evidence of the effectiveness of NSAIDs,²⁷ steroid injections²⁸ and physiotherapy²⁹ for shoulder complaints. There is still a need for randomized trials of adequate methodological quality and sample size, preferably in a primary health care setting.

Conclusions

We conclude that a considerable number (41%) of patients with new episodes of shoulder pain show persistent or recurrent symptoms 12 months after presenting their complaints to their general practitioner. In general practice, we suggest that it may be possible to distinguish between patients who show a speedy recovery and those with a high risk of long-standing and recurrent complaints on the basis of a history of slight trauma or overuse related to unusual activities, early presentation, and the absence of concomitant neck pain. Of course, it is not suitable to formulate guidelines for therapy on the basis of this observational study. Management strategies in primary care should be evaluated in randomized clinical trials. Nonetheless, patients with a favourable prognostic profile may be informed of their relatively high probability of an early recovery. An initial wait-and-see policy, with pain medication if necessary, may prove to be the preferred treatment strategy for these patients.

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